



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------------------------|-------------|----------------------|---------------------|------------------|
| 10/521,529 | 06/27/2005 | Per Harald Moe | 23115.001004 | 8783 |
| 64770 | 7590 | 10/27/2010 | EXAMINER | |
| Momkus McCluskey, LLC | | | MEHTA, MEGHA S | |
| 1001 Warrenville Road, Suite 500 | | | | |
| Lisle, IL 60532 | | | ART UNIT | PAPER NUMBER |
| | | | 1734 | |
| | | | MAIL DATE | DELIVERY MODE |
| | | | 10/27/2010 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/521,529 | MOE ET AL. | |
| | Examiner | Art Unit | |
| | MEGHA MEHTA | 1734 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 13 September 2010.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 2,4-12,15 and 18-24 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 2,4-12,15 and 18-24 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 13, 2010, has been entered.

Claim Objections

2. Claim 15 is objected to because of the following informalities: the claim recites "...temperature difference between the tip and and the base of the first end...." Please remove one "and". Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 18, 19, 15 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by US 4,669,650 Moe.

Regarding claim 18, Moe '650 teaches a method for interconnecting by forge welding a first tubular **1** having a first end with a second tubular **2** having a second end (column 1, lines 5-6), the method comprising forming the first end such that, in an unheated condition, at least an outer wall of the first end extending from a base of the first end to an end face of the first end is

Art Unit: 1734

disposed at a predetermined inward angle with respect to a center line of the first tubular (figure 2), the predetermined inward angle selected as a function of an estimated temperature difference between the end face and the base when the first end is heated for forge welding, and a coefficient of thermal expansion of the first end (column 3, lines 11-15 and 24-29); positioning the first end of the first tubular to be proximate to the second end of the second tubular such that the center lines of the first and second tubulars are in axial alignment (column 2, lines 53-55); heating the first end of the first tubular and the second end of the second tubular into a predetermined heated condition, such that there exists a predetermined temperature difference between the end face of the first end and the base of the first end (column 3, lines 11-15); while the first and second ends are in the heated condition, pressing the first end of the first tubular into the second end of the second tubular to thereby join the first tubular to the second tubular (column 3, lines 16-22); wherein said predetermined inward angle is selected from the range of approximately one degree to approximately five degrees (shown in the portion of figure 2 to the right).

approximately one
degree to approximately
five degrees



Moe '650 does not explicitly teach displacing the wall by thermal expansion. However, all heating causes thermal expansion, and as the method and materials of Moe '650 are indistinguishable from that of the instant invention, it would be reasonable to expect that the thermal expansion caused in the product of Moe '650 would also angularly displace at least the outer wall of the first end by thermal expansion such that the outer wall of the first end is deformed into a substantially longitudinally oriented cylindrical surface. "Where the claimed and

prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established" (MPEP 2112.01 Section I).

Regarding claim 19, Moe '650 teaches forming the first end such that, in the unheated condition, an inner wall of the first end extending from the base of the first end to the end face of the first end is disposed at said predetermined inward angle with respect to the center line of the first tubular (figure 2).

Moe '650 does not explicitly teach displacing the wall by thermal expansion. However, all heating causes thermal expansion, and as the method and materials of Moe '650 are indistinguishable from that of the instant invention, it would be reasonable to expect that the thermal expansion caused in the product of Moe '650 would also angularly displace at least the inner wall of the first end by thermal expansion such that the inner wall of the first end is deformed into a substantially longitudinally oriented cylindrical surface. "Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established" (MPEP 2112.01 Section I).

Regarding claim 15, Moe '650 teaches a method of forge welding two tubulars by heating with an induction coil and pressing the two end faces together, further comprising the step of selecting the predetermined inward angle such that the ratio between an average diameter $D(t)$ on the end face of the first end and an average diameter $D(b)$ at the base of the first end is related to an estimated temperature difference between the tip and the base of the first end and a thermal expansion co-efficient of the first end (column 3, lines 11-15 and 24-36).

Regarding claim 4, Moe '650 teaches machining the first and second ends to reduce a wall thickness in a welding zone (column 3, lines 24-25).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 20-24, 6 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,669,650 Moe in view of US 5,721,413 Moe.

Regarding claim 20, Moe '650 teaches a method of forge welding but does not teach an annular channel. Moe '413 teaches a method of forge welding two tubulars together including forming the second end **4** to include an annular channel with a radially outward wall, a radially inward wall, and a channel bottom joining the outward and inward walls of the channel, at least the radially outward wall disposed at said predetermined inward angle with respect to the center line of the second tubular while the second end is in an unheated condition (figure 3); during said step of pressing the first end of the first tubular into the second end of the second tubular, inserting the end face of the first end into the channel of the second end; and during said step of pressing the first end of the first tubular into the second end of the second tubular, fitting the outer wall of the first end to the outward wall of the channel of the second end (figure 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the concave and convex shapes of the end faces of '413 in the method of

'650 because the concave and convex shapes help secure one piece to another and reduce sliding and shifting of the pieces relative to each other during the welding process.

Neither Moe '650 nor Moe '413 teaches displacing the wall by thermal expansion. However, all heating causes thermal expansion, and as the method and materials of Moe '650 in view of Moe '413 are indistinguishable from that of the instant invention, it would be reasonable to expect that the thermal expansion caused in the product of Moe '650 in view of Moe '413 would also angularly displace the outward wall of the channel by thermal expansion such that the outward wall of the channel is deformed into a substantially longitudinally oriented cylindrical surface. "Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established" (MPEP 2112.01 Section I).

Regarding claim 21, Moe '413 teaches a method of forge welding two tubulars together including forming the inward wall of the channel in the second end to be disposed at said predetermined inward angle with respect to the center line of the second tubular while the second end is in an unheated condition (figure 3); forming the inner wall of the first end of the first tubular to be disposed at the predetermined inward angle with respect to the center line of the first tubular (figure 3); and during said step of pressing the first end of the first tubular into the second end of the second tubular, fitting the inner wall of the first end to the inward wall of the channel of the second end (figure 3).

Neither Moe '650 nor Moe '413 teaches displacing the wall by thermal expansion. However, all heating causes thermal expansion, and as the method and materials of Moe '650 in

view of Moe '413 are indistinguishable from that of the instant invention, it would be reasonable to expect that the thermal expansion caused in the product of Moe '650 in view of Moe '413 would also angularly displace the inward wall of the channel and the inner wall of the first end of the first tubular by thermal expansion such that the inward wall of the channel and the inner wall of the first end of the first tubular are deformed into substantially longitudinally oriented cylindrical surfaces. "Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established" (MPEP 2112.01 Section I).

Regarding claim 22, Moe '650 teaches a method of forge welding but does not teach the angle of the outer wall of the second end. Moe '413 teaches a method of forge welding two tubulars together including forming the second end such that, in an unheated condition, at least an outer wall of the second end extending from a base of the second end to an end face of the second end is at said predetermined inward angle with respect to a center line of the second tubular (figure 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the concave and convex shapes of the end faces of '413 in the method of '650 because the concave and convex shapes help secure one piece to another and reduce sliding and shifting of the pieces relative to each other during the welding process.

Neither Moe '650 nor Moe '413 teaches displacing the wall by thermal expansion. However, all heating causes thermal expansion, and as the method and materials of Moe '650 in view of Moe '413 are indistinguishable from that of the instant invention, it would be reasonable

to expect that the thermal expansion caused in the product of Moe ‘650 in view of Moe ‘413 would also angularly displace the outer wall of the second end by thermal expansion such that the outer wall of the second end is deformed into a substantially longitudinally oriented cylindrical surface. “Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established” (MPEP 2112.01 Section I).

Regarding claim 23, Moe ‘650 teaches a method of forge welding but does not teach convex and concave ends. Moe ‘413 teaches a method of forge welding two tubulars together including forming the end face of the first end 3 to have a convex shape, and forming a face of the second end 4 which mates with the end face of the first end to have a concave shape (figure 3).

Regarding claim 24, Moe ‘413 teaches that said face of the second end is a bottom of an annular channel formed in the second end (figure 3).

Regarding claim 6, Moe ‘650 teaches that the convex shape is wedge shaped (figure 1).

Regarding claim 2, Moe ‘650 teaches a method of forge welding but does not teach the average diameter of the tip or the average diameter of the base of the tubular ends. Moe ‘413 teaches a method of forge welding two tubulars together where $D(t)$ is just smaller than $D(b)$ (see page 3 of the previous Office Action mailed July 22, 2009), but does not teach the exact ratio. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to determine the optimum ratio of $D(t)/D(b)$. “[W]here the general conditions of a

claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation,” (MPEP 2144.05 Section II).

7. Claims 5, 7, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,669,650 Moe in view of JP 03-243286 Masakatsu et al.

Regarding claim 5, Moe ‘650 teaches a method of forge welding two tubulars but does not teach the composition of the pipes or the cladding. Masakatsu teaches a method for joining clad tubes where the tubulars comprising a relatively lower grade steel base pipe and a higher grade steel cladding on an inner and/or outer surface of the base pipe and the first and second end faces are shaped such that when the tubular ends are pressed together the end faces of the cladding(s) touch each other before the end faces of the base pipe ends touch (p.2 line 46-page 3, line 1 and figure 2). It would have been obvious to one of ordinary skill in the art to include the composition and configuration of Masakatsu in the method of Moe '650 because this cladding and configuration protects the pipes from final machining during the welding and polishing process.

Regarding claim 7, Moe ‘650 teaches a method of forge welding two tubulars but does not teach the cladding. Masakatsu teaches a method for joining clad tubes where the adjacent end portions of the adjacent base pipes are covered with the clad metal (figure 2) such that the ends may be machined without exposing the base pipes. It would have been obvious to one of ordinary skill in the art to include the cladding of Masakatsu in the method of Moe because this cladding protects the pipes from final machining during the welding and polishing process.

Regarding claim 8, Moe ‘650 teaches flushing a welding zone with a flushing gas injected into the welding zone from an uncladded side of the tubular, such that the flushing gas

continues to reach the ends of the still spaced base pipes after the claddings have touched (column 2, lines 56-65).

Regarding claim 9, Moe '650 teaches the flushing gas as a reducing flushing gas (column 2, lines 65-67).

8. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,669,650 Moe in view of JP 03-243286 Masakatsu et al as applied to claim 9 above, and further in view of US 3,941,299 Godfrey.

Regarding claims 10-12, Moe '650 teaches a method of forge welding two tubulars by heating. Masakatsu teaches claddings. Neither Moe '650 nor Masakatsu teaches the composition of the flushing gas. Godfrey teaches a method of brazing metal pieces together where a non-explosive flushing gas mixture comprises more than 90% by volume of nitrogen and at least 2% by volume of hydrogen (column 2, lines 55-59). It would have been obvious to one of ordinary skill in the art to substitute welding for brazing because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention. It would have been further obvious to one of ordinary skill in the art to include the flushing gas of Godfrey in the method of Moe and Masakatsu because a non-reactive flushing gas prevents oxidation during the welding process.

Response to Arguments

9. Applicant's arguments filed September 13, 2010, have been fully considered but they are not persuasive.

Applicant argues multiple times throughout the remarks that the present claims are distinguished over the prior art because of the limitations displacing various walls and portion of

walls into cylindrical surfaces by thermal expansion. While neither Moe '650 nor Moe '413 explicitly recite this limitation, it must also be occurring in the Moe references because the Moe references have the same materials and method steps. The displacing by thermal expansion step in the claims requires only a particular angular slope to the walls and a heated condition. If that is all that is required to achieve this cylindrical surface, then the Moe references also have a cylindrical surface.

Applicant argues that claim 18 requires an angle to be calculated beforehand. However, an angle for the slope of the pipes must be calculated beforehand, either during the designing of the pipes or during manufacturing on the pipes. The pipes cannot be made without knowing what the predetermined angle is going to be.

Applicant argues that the angle of 1 to 5 degrees in claim 18 distinguishes over Examiner's argument of microscopic thermal expansion. However, it is unclear to the Examiner how defining a particular geometry of the pipes is related to the expanded result after heat is applied. Additionally, it is unclear how the geometry of the pipes is related to the displacement of the walls during thermal expansion.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MEGHA MEHTA whose telephone number is (571)270-3598. The examiner can normally be reached on Monday to Friday 8:30 am to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Emily Le can be reached on 571-272-0903. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/EMILY M LE/
Supervisory Patent Examiner, Art Unit 1734

/Megha Mehta/
Examiner, Art Unit 1734